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Remarks:

Reconsideration of the application is requested.

Claims 1-3 and 11-25 are now in the application. Claim 1 has been amended. Claims 4-10 have been cancelled. Claims 11-14 have been withdrawn. Claims 16-25 have been added.

In item 2 on page 2 of the above-mentioned Office action, claims 1-5, 7-10, and 15 have been rejected as being unpatentable over Kobayashi et al. (Japanese Patent Application Publication 02-248393) in view of Balog et al. (US Pat. No. 4,123,571) under 35 U.S.C. § 103(a).

The rejection has been noted and claim 1 has been amended in an effort to even more clearly define the invention of the instant application. Support for the changes is found in original claims 4 and 7-10 as well as on page 13, line 10 of the specification.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 calls for, inter alia:

> a susceptor for supporting a substrate to be coated in the gaseous atmosphere;
>
> said susceptor including an insert having a surface and including a graphite core; and

> a metal carbide layer of a given thickness covering said graphite core, said metal carbide layer including one carbide selected from the group consisting of tantalum carbide, niobium carbide, tungsten carbide, molybdenum carbide, chromium carbide, vanadium carbide and hafnium carbide and forming at least a portion of said surface, said portion supporting the substrate.

Although Balog et al. mention a susceptor 14, Balog et al. do not refer thereby to an element on which the substrate, which is to be coated, is disposed but instead to a container into which the substrate to be coated is introduced (see, in particular, Fig. 3). In Balog et al., the substrate does not lie on the susceptor 14 but on two support members 22 and 24 within susceptor 14. The susceptor according to the invention of the instant application would thus correspond to these support members 22 and 24 in Balog et al., and not to the susceptor (container) 14. The fact that the substrate lies on the susceptor is expressly recited in the wording of claim 1 of the instant application. In addition, Balog et al. do not indicate metal carbide but instead sapphire (see column 2, line 57) as a material for the support members 22 and 24 and thus for the support surface of the substrate which is to be coated. Consequently, Balog et al. do not provide any teaching for the use of a susceptor in the sense of the invention of the instant application.

Even the wall of the container 14 in Balog et al., which does not serve as a bearing surface, does not contain a coated

graphite core, as in claim 1 of the instant application. Instead, Balog et al. preferably use a tantalum base body with a tantalum-carbide coating (see column 3, lines 45-49). It was shown, however, that such a TaC-coating on a Ta base body at very high temperature of up to 2000°C (see, for example, page 2, line 25) is not stable and runs the danger of chipping. With a coated metal core, i.e. a Ta-core, the danger exists that the metal carbide coating will grow deeper and deeper into the metal core caused by a reaction of the material of the susceptor insert with a process atmosphere, containing, for example, propane. Due to the highly brittle behavior of the metal carbide, the risk of the formation of cracks would increase greatly. Furthermore, a disadvantageous volume jump could also take place with the formation of metal carbide. The high temperature which is common during the treatment of the substrate and which is at hand in particular during a SiC processing, can highly accelerate the disadvantageous reaction so that the lifespan of a carbide-coated metal core can be only a very few hours. This behavior, however, plays a minor role with the use of a metal carbide coated graphite core because the system propane-metal carbide-graphite is substantially in phase balance. The use of a graphite core for coating with one of the metal carbides mentioned in amended claim 1 of the instant application thus has substantial advantages as compared to the use of a metal core. Balog et al. do not disclose or suggest this technical

teaching for the wall of the container 14 and particularly not for the relevant support members 22 and 24.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art and since claims 2-3 and 15 are ultimately dependent on claim 1, they are believed to be patentable as well. Claims 4-5 and 7-10 have been cancelled.

In item 3 on pages 2-3 of the above-mentioned Office action, claims 1-4, 7-10, and 15 have been rejected as being unpatentable over Kobayashi et al. in view of Lennartz (US Pat. No. 5,498,442) under 35 U.S.C. § 103(a).

Although Lennartz discloses a method for producing metal carbide coatings, this pertains to very small particles (see, for example, column 4, line 45), which are to be levitated in particular by a gas flow 25 (see column 3, lines 7-9). This method can neither be used for the susceptor insert of Kobayashi et al., nor for the insert according to the invention of the instant application. They are much larger and much heavier components. The method of Lennartz can thus not be combined with other prior art due to the strongly deviating proportions of the base bodies to be coated.

Furthermore, the intended purpose in Lennartz clearly differs from that of Kobayashi et al. and that of the invention of the instant application. With the described coating process, Lennartz intends to seal nuclear fuels (see column 1, lines 20 to 29, or column 1, lines 59 to 63). The elements coated in such a manner thus do not serve as a base for a semiconductor wafer which is to be coated. Kobayashi et al. clearly pertain to semiconductor technology, as does the object of the invention of the instant application (see page 1, line 20, and page 12, lines 14 and 17 of the specification). That technology and Lennartz are two entirely different areas of technology (nuclear technology v. semiconductor technology) so that a combination of the prior art references is not considered to be obvious without additional reasons. The Examiner, however, has not indicated such additional reasons.

Claim 1 is, therefore, believed to be patentable over the art and since claims 2-3 and 15 are ultimately dependent on claim 1, they are believed to be patentable as well. Claims 4-5 and 7-10 have been cancelled.

In item 4 on page 3 of the above-mentioned Office action, claims 1-3, 5, 7, 9-10, and 15 have been rejected as being unpatentable over Drage (US Pat. No. 4,793,975) in view of Yamaga et al. (US Pat. No. 5,614,447) under 35 U.S.C. § 103(a).

A combination of Drage and Yamaga et al. would not lead to claim 1 of the instant application because neither Yamaga et al. nor Drage describe a graphite core which is provided with a metal carbidization. Instead, Yamaga et al. describe a nitride core, in particular a core of gallium nitride, aluminum nitride or boron nitride (see column 4, lines 17 ff) which is to be coated.

According to claim 1 of the instant application, a coated graphite core is to be provided. A graphite core with a good heat-absorbing quality does not need to be subjected to a method according to Yamaga et al., i.e. provided with a metal carbidization, solely to improve the heat absorption. This would be entirely superfluous because the graphite core which is being used in the invention of the instant application already has a good thermal absorption.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art and since claims 2-3 and 15 are ultimately dependent on claim 1, they are believed to be patentable as well. Claims 5, 7, and 9-10 have been cancelled.

In item 5 on pages 3-4 of the above-mentioned Office action, claims 1-4 and 15 have been rejected as being unpatentable over Kobayashi et al. in view of Takasaki et al. (Japanese Patent Application Publication 61-251021) under 35 U.S.C. § 103(a).

Takasaki et al. describe neither a graphite core to be coated nor a metal carbide provided for a coating according to claim 1 of the instant application. As far as can be seen from the English-language abstract of Takasaki et al., an aluminum or stainless steel body is to be provided with a titanium carbide layer. Both are clearly outside of the scope of claim 1 of the instant application.

Furthermore, titanium, in particular in the semiconductor material SiC, represents a doping material which forms a flat acceptor level in SiC. Furthermore, titanium is incorporated well in SiC so that a use of titanium as a material for the susceptor insert could lead to an undesirable contamination (doping) of the (SiC) substrate which is disposed on the susceptor insert and which is to be treated. According to page 13, lines 4-11 of the specification of the instant applicaiton, metals which can serve as doping materials in SiC are not suitable for a metal carbide coating. Aluminum and boron are mentioned as examples. Analogously, however, this

also holds true for other potential SiC doping materials, i.e. for titanium.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art and since claims 2-3 and 15 are ultimately dependent on claim 1, they are believed to be patentable as well. Claim 4 has been cancelled.

Claims 16-25 have been amended. The support for claims 16-17 may be found on page 6, lines 3-5 or page 12, lines 18-20. The support for claim 18 may be found on page 9, lines 18-19 of the specification. Since claim 1 is believed to be patentable as discussed above and claims 16-18 are dependent on claim 1, they are believed to be patentable as well.

New independent claim 19 includes all the features of the original claim 1 and added thereto are the features of a hydrogen-containing gas atmosphere and SiC processing (= SiC coating on an SiC substrate). None of the cited prior art references contains a SiC coating in a hydrogen-containing gas atmosphere. The use of hydrogen as process gas, which is particularly desired during a SiC coating, is additionally

favored if the bearing surface provided for holding the SiC substrate has a good resistance against the hydrogen.

Furthermore, before the invention of the instant application it was common to use a graphite part coated with SiC for holding semiconductor wafers (see, for example, page 3, lines 8 ff). In particular, for holding a SiC substrate, however, a SiC coating of the susceptor has proven itself to be unfavorable because it results in the danger of undesired growing into the rear side of the SiC substrate (see, for example page 3, lines 23 ff). This problem was first recognized by the inventors of the invention of the instant application and was solved by a metal carbide coating which has the required resistance and thus is especially advantageous for use in SiC processing.

Since claim 19 is, therefore, believed to be patentable over the art and since claims 20-25 are ultimately dependent on claim 19, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1-3 and 15-25 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate a telephone call so that, if possible, patentable language can be worked out.

If an extension of time for this paper is required, petition for extension is herewith made. Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

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For Applicants

YHC:cgm

September 4, 2003

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